

## A P P E N D I X D

### R E G R E S S I O N R E S U L T S

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**R**egression modeling was used to estimate the impact of the six elderly nutrition demonstrations including models to test the significance of unadjusted impact estimates and models to estimate regression-adjusted impacts for households with elderly and for subgroups of that population. This appendix presents results of the various regression models.

#### TESTING SIGNIFICANCE OF UNADJUSTED IMPACT ESTIMATES

To test whether the changes in elderly participation in the demonstration counties between the month prior to the start of a demonstration and month 21 were significantly different from the “typical” change observed in other counties in the same state, the following regression was estimated:

$$\left( \frac{y_i^{21} - y_i^{-1}}{y_i^{-1}} \right) = \alpha + d_i \beta + e \quad (1)$$

where,

$y_i^{21}$  = elderly FSP households in month 21 in county  $i$

$y_i^{-1}$  = elderly FSP households in county  $i$  in the month immediately prior to the start of the demonstration

$d_i$  = indicator of demonstration status for county  $i$

The results, presented in Table D.1, show that the changes in elderly participation observed in Yavapai County (Arizona), Waldo County (Maine), and Alamance County North Carolina were significantly greater than the typical changes observed in other counties in the same state. For Gadsden and Leon Counties in Florida, the changes observed were not significantly different when compared with changes in all Florida counties, but they were significantly greater than the changes observed in the comparison sites. While our

confidence in the Florida impact estimates would be greater if the differences were significant relative to the entire state, the fact that they are significantly different from the counties most similar in terms of elderly FSP participation patterns still allows us to conclude that the changes are larger than we would have expected to observe without the demonstration.

## SUBGROUP ANALYSIS

One of the two regression models presented in Chapter III is the 21 month impact model. This model estimates the percent change in elderly FSP participation in each county between the month immediately before the start of the demonstration (“month –1”) and the 21<sup>st</sup> month of the demonstration. Formally, this model is estimated as:

$$q_i^{21} = \left[ \left( \frac{y_i^{21} - y_i^{-1}}{y_i^{-1}} \right) \times 100 \right] = \alpha + d_i \beta + \left[ \left( \frac{x_i^{21} - x_i^{-1}}{x_i^{-1}} \right) \times 100 \right] \gamma + S_i \phi + e \quad (2)$$

where,

- $q_i^{21}$  = percent change in elderly FSP participation in county  $i$  between the month immediately prior to the start of the demonstration and month 21
- $y_i^{21}$  = elderly FSP households in county  $i$  and month 21
- $y_i^{-1}$  = elderly FSP households in county  $i$  in the month immediately prior to the start of the demonstration
- $d_i$  = indicator of demonstration status for county  $i$
- $x_i^{21}$  = nonelderly FSP households in county  $i$  and the last month of the demonstration
- $x_i^{-1}$  = nonelderly FSP households in county  $i$  in the month immediately prior to the start of the demonstration
- $S_i$  = an array of six baseline county characteristics associated with elderly FSP participation

The 21 month impact model was estimated for a variety subgroups of elderly FSP households in each state. The results from the estimation over subgroups are summarized in Table D.2. Table D.3 presents the results for all elderly households (these are the same results presented in Chapter III); Table D.4 presents the results for households eligible for a \$10 benefit; Table D.5 presents the results for elderly FSP households with an individual over age 70; Table D.6 presents the results for elderly FSP households consisting of only one person; Table D.7 presents the results for elderly FSP households with a black head of household; and Table D.8 presents the results for elderly FSP households with an Hispanic head of household.

**Table D.1: Significance Test for Unadjusted Impacts<sup>a</sup>**

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine	Michigan	Connecticut	North Carolina
<b>ESTIMATED USING ALL COUNTIES IN EACH STATE</b>								
Intercept	6.56*	6.38*	26.56*	23.76*	21.94*	18.09*	17.08*	8.71*
	(1.94)	(1.91)	(5.78)	(4.74)	(1.27)	(1.68)	(3.68)	(0.79)
Demonstration Flag	11.38	24.14	5.05	49.78*	24.25*	2.51	-3.80	39.7*
	(16.00)	(15.79)	(23.13)	(18.96)	(5.09)	(15.05)	(14.77)	(7.91)
N	67	67	15	15	15	79	160	99
R- Square	0.0076	0.0342	0.0034	0.3298	0.6188	0.0004	0.0004	0.2046
<b>ESTIMATED USING DEMONSTRATION AND COMPARISON COUNTIES ONLY</b>								
Intercept	-5.60	2.99	30.69	n.a.	n.a.	15.35*	49.14*	14.52*
	(2.23)	(2.41)	(6.12)	n.a.	n.a.	(1.08)	(20.07)	(3.24)
Demonstration Flag	23.55*	27.53*	0.92	n.a.	n.a.	5.25	-35.85	33.89*
	(4.45)	(6.83)	(10.59)	n.a.	n.a.	(2.65)	(28.38)	(9.74)
N	3	7	15	n.a.	n.a.	5	19	8
R- Square	0.93	0.7306	0.0075	n.a.	n.a.	0.4954	0.0814	0.6339

<sup>a</sup>Models for Florida, Connecticut, and North Carolina demonstrations were estimated for pure elderly households only. Models for Arizona, Maine, and Michigan were estimated for all households with elderly. The Connecticut model was estimated over towns instead of counties.

n.a. Too few comparison counties to estimate model.

**Table D.2: Summary of Regression-Adjusted Impacts, All Subgroups<sup>a</sup>**

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine	Michigan	Connecticut	North Carolina
All Elderly Households	18.3	22.0	-5.5	38.1	23.9	9.1	3.2	31.4
Households Eligible for \$10 Benefit	13.0	13.3	72.6	127.1	89.2	40.7	-21.5	57.7
Households with Member Over 70	25.2	25.0	-2.0	32.6	31.3	21.9	0.4	36.6
Single-Person Households	21.1	20.4	-8.8	40.7	24.4	9.4	4.9	31.7
Households with Black Household Head	20.9	20.3	-34.6	100.6	3.9	7.8	3.3	33.5
Households with Hispanic Household Head	0.5	28.6	-25.9	25.6	n.a.	-62.6	5.1	-10.6

<sup>a</sup>Models for Florida, Connecticut, and North Carolina demonstrations were estimated for pure elderly households only. Models for Arizona, Maine, and Michigan were estimated for all households with elderly.

**Table D.3: Results of 21 Month Impact Model for All Households**

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine	Michigan	Connecticut	North Carolina
<b>Unadjusted Impact</b>	<b>22.3</b>	<b>23.5</b>	<b>-2.4</b>	<b>36.8</b>	<b>30.9</b>	<b>5.3</b>	<b>3.8</b>	<b>35.8</b>
<b>Regression Adjusted Impact</b>	<b>18.3</b>	<b>22.0</b>	<b>-5.5</b>	<b>38.1</b>	<b>23.9</b>	<b>9.1</b>	<b>3.2</b>	<b>31.4</b>
Intercept	-0.962 (7.279)	-7.581 (6.896)	113.334 (52.930)	85.077* (21.849)	13.959 (18.769)	13.235 (8.197)	56.059* (16.519)	9.887 (5.389)
Demo. Flag	18.330 (9.698)	22.041* (8.115)	-5.532 (16.198)	38.111* (6.945)	23.923* (7.618)	9.081 (12.85)	3.199 (15.665)	31.433* (7.683)
Nonelderly Participation Trends	0.343* (0.067)	0.346* (0.068)	-0.645 (0.869)	-0.420 (0.357)	0.187 (0.213)	0.359* (0.057)	0.026 (0.091)	0.135* (0.060)
Elderly Participants	<0.001 <(0.000)	<0.000 <(0.000)	-0.0149 (0.015)	-0.009 (0.006)	0.002 (0.005)	-0.001 (0.002)	0.040 (0.031)	-0.001 (0.003)
Elderly Part. Rate	-1.076 (0.591)	-0.734 (0.587)	-3.203 (2.560)	-1.968 (1.040)	0.028 (1.107)	-0.706 (1.694)	-8.369 (3.543)	-0.979* (0.406)
Prior Changes in Participation of Elderly	0.027 (0.085)	0.043 (0.083)	1.340 (1.079)	0.716 (0.446)	0.090 (0.564)	-0.179 (0.118)	-0.090* (0.082)	0.004 (0.095)
Percent Non-white	0.128 (0.141)	0.225 (0.117)	-0.861 (0.422)	-0.594* (0.179)	-2.189 (1.691)	-0.365 (0.281)	0.190 (0.762)	0.116 (0.064)
Percent Elderly	-0.088 (0.210)	0.103 (0.202)	-2.365 (1.890)	-1.693 (0.774)	0.305 (1.048)	-0.092 (0.396)	-2.181* (1.031)	-0.090 (0.254)
Population Density	0.001 (0.002)	0.001 (0.002)	0.245 (0.265)	0.166 (0.107)	-0.002 (0.031)	0.005 (0.011)	<0.000 (0.005)	0.001 (0.007)
N	66	66	15	15	16	80	160	100
R- Square	0.5118	0.5407	0.5497	0.9237	0.7346	0.4090	0.0675	0.3627

\*Coefficient significant at the 5% level of confidence.

**Table D.4: Results of 21 Month Impact Model, Households Eligible for a \$10 Benefit**

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine	Michigan	Connecticut	North Carolina
<b>Unadjusted Impact</b>	<b>22.3</b>	<b>23.5</b>	<b>-2.4</b>	<b>36.8</b>	<b>30.9</b>	<b>5.3</b>	<b>3.8</b>	<b>35.8</b>
<b>Regression Adjusted Impact</b>	<b>13.0</b>	<b>13.3</b>	<b>72.6</b>	<b>127.1</b>	<b>89.2</b>	<b>40.7</b>	<b>-21.5</b>	<b>57.7</b>
Intercept	1.095 (9.8985)	-3.136 (9.4010)	-135.668 (403.42)	-146.292 (378.47)	-53.799 (31.312)	46.409* (16.007)	24.031 (19.759)	10.368 (18.442)
Demo. Flag	12.990 (15.177)	13.334 (13.016)	72.615 (143.35)	127.111 (139.54)	89.160* (13.986)	40.673 (26.034)	-21.466 (16.866)	57.702 (29.387)
Nonelderly Participation Trends	0.045 (0.0418)	0.043 (0.0415)	0.704 (1.6815)	0.596 (1.5700)	0.142 (0.2779)	0.218* (0.0838)	0.027 (0.0638)	0.066 (0.0707)
Elderly Participants	0.000 (0.0003)	0.000 (0.0003)	0.012 (0.1136)	0.007 (0.1049)	0.011 (0.0099)	0.004 (0.0049)	0.019 (0.0343)	0.000 (0.0134)
Elderly Part. Rate	-1.286 (0.8600)	-1.091 (0.8749)	-1.319 (23.436)	-0.133 (22.471)	-0.948 (1.9314)	-3.772 (3.4352)	-2.921 (4.0313)	0.713 (1.5558)
Prior Changes in Participation of Elderly	0.070 (0.1349)	0.078 (0.1351)	-20.391 (11.029)	-20.696 (10.342)	-0.182 (1.0115)	0.247 (0.2405)	-0.091 (0.1080)	0.632 (0.3711)
Percent Non-white	0.099 (0.2198)	0.172 (0.1887)	0.123 (3.5011)	0.659 (3.4275)	-2.405 (2.7031)	-0.293 (0.5701)	-0.580 (0.8278)	-0.040 (0.2524)
Percent Elderly	0.003 (0.3287)	0.125 (0.3249)	18.894 (20.009)	18.376 (18.675)	4.180 (1.9152)	-0.392 (0.7997)	-1.867 (1.2561)	2.758* (0.9886)
Population Density	0.000 (0.0037)	0.000 (0.0037)	0.153 (2.0078)	0.278 (1.8750)	0.024 (0.0576)	-0.015 (0.0222)	0.003 (0.0059)	-0.024 (0.0279)
N	66	66	15	15	16	80	123	100
R-Square	0.1120	0.1169	0.5774	0.6129	0.9015	0.1502	0.0609	0.2362

\*Coefficient significant at the 5% level of confidence.

Table D.5: Results of 21 Month Impact Model, Households With an Individual Over Age 70

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine	Michigan	Connecticut	North Carolina
Unadjusted Impact	22.3	23.5	-2.4	36.8	30.9	5.3	3.8	35.8
Regression Adjusted Impact	25.2	25.0	-2.0	32.6	31.3	21.9	0.4	36.6
Intercept	-0.891 (10.164)	-9.268 (9.8268)	113.793 (49.257)	91.341* (26.398)	8.247 (23.568)	15.239 (9.2679)	0.316 (18.710)	-1.859 (6.0421)
Demo. Flag	25.152 (13.541)	25.006* (11.564)	-2.009 (15.074)	32.583* (8.3905)	31.264* (9.5664)	21.941 (14.530)	0.381 (15.267)	36.616* (8.6152)
Nonelderly Participation Trends	0.239* (0.0975)	0.240* (0.0965)	-1.027 (0.8086)	-0.850 (0.4317)	0.070 (0.2669)	0.328* (0.0639)	-0.030 (0.1182)	0.048 (0.0671)
Elderly Participants	0.000 (0.0003)	0.000 (0.0003)	-0.020 (0.0136)	-0.015 (0.0071)	0.003 (0.0057)	0.001 (0.0028)	0.020 (0.0304)	0.003 (0.0038)
Elderly Part. Rate	-1.017 (0.8256)	-0.626 (0.8360)	-3.489 (2.3824)	-2.536 (1.2561)	-0.045 (1.3897)	-0.829 (1.9152)	-4.193 (3.5420)	-1.030* (0.4554)
Prior Changes in Participation of Elderly	-0.023 (0.1189)	-0.007 (0.1182)	1.630 (1.0043)	1.133 (0.5388)	-0.090 (0.7080)	-0.068 (0.1336)	0.140 (0.0837)	-0.002 (0.1060)
Percent Non-white	0.130 (0.1962)	0.272 (0.1672)	-0.795 (0.3922)	-0.572* (0.2165)	-3.053 (2.1234)	-0.386 (0.3178)	0.394 (0.7441)	0.181* (0.0721)
Percent Elderly	-0.153 (0.2937)	0.085 (0.2885)	-2.641 (1.7588)	-2.120 (0.9349)	0.932 (1.3158)	-0.451 (0.4477)	1.149 (1.1326)	0.334 (0.2852)
Population Density	0.002 (0.0033)	0.002 (0.0032)	0.322 (0.2467)	0.264 (0.1288)	0.009 (0.0384)	-0.003 (0.0124)	-0.002 (0.0052)	-0.002 (0.0079)
N	66	66	15	15	16	80	147	100
R-Square	0.2714	0.2859	0.5334	0.8668	0.7418	0.3253	0.0402	0.2790

\*Coefficient significant at the 5% level of confidence.

**Table D.6: Results of 21 Month Impact Model, Households Consisting of Only One Person**

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine	Michigan	Connecticut	North Carolina
<b>Unadjusted Impact</b>	<b>22.3</b>	<b>23.5</b>	<b>-2.4</b>	<b>36.8</b>	<b>30.9</b>	<b>5.3</b>	<b>3.8</b>	<b>35.8</b>
<b>Regression Adjusted Impact</b>	<b>21.1</b>	<b>20.4</b>	<b>-8.8</b>	<b>40.7</b>	<b>24.4</b>	<b>9.4</b>	<b>4.9</b>	<b>31.7</b>
Intercept	-0.760 (7.2882)	-7.504 (7.0488)	141.225* (51.328)	86.172* (33.554)	16.854 (18.013)	17.231* (7.9342)	47.213* (16.275)	14.557* (5.0895)
Demo. Flag	21.093* (9.7159)	20.422* (8.2748)	-8.824 (17.369)	40.726* (11.950)	24.407* (6.9489)	9.367 (12.882)	4.935 (15.464)	31.748* (7.7724)
Nonelderly Participation Trends	0.193* (0.0406)	0.191* (0.0401)	-0.374 (0.5474)	0.182 (0.3613)	0.041 (0.1969)	0.189* (0.0452)	0.064 (0.0594)	0.102* (0.0433)
Elderly Participants	0.000* (0.0002)	0.000 (0.0002)	-0.023 (0.0163)	-0.009 (0.0100)	0.002 (0.0041)	0.000 -0.002	0.040 (0.0303)	0.001 (0.0035)
Elderly Part. Rate	-1.469* (0.5626)	-1.159* (0.5688)	-6.279 (2.6966)	-4.510* (1.6211)	-0.359 (0.9279)	-0.026 (1.6862)	-8.152* (3.4992)	-1.074* (0.4111)
Prior Changes in Participation of Elderly	0.068 (0.0849)	0.082 (0.0843)	1.596 (1.2107)	0.442 (0.7703)	-0.066 (0.4820)	-0.177 (0.1182)	-0.097 (0.0827)	0.052 (0.0968)
Percent Non-white	0.070 (0.1415)	0.191 (0.1202)	-0.583 (0.3722)	-0.318 (0.2346)	-1.580 (1.5275)	-0.574* (0.2818)	0.170 (0.7528)	0.097 (0.0664)
Percent Elderly	-0.077 (0.2107)	0.118 (0.2069)	-3.830 (2.0696)	-2.409 (1.2730)	0.391 (0.9392)	-0.256 (0.3956)	-1.762 (1.0180)	-0.214 (0.2603)
Population Density	0.003 (0.0024)	0.003 (0.0023)	0.321 (0.2809)	0.132 (0.1698)	0.003 (0.0275)	0.004 (0.0110)	0.000 (0.0052)	-0.003 (0.0073)
N	66	66	15	15	16	80	160	100
R- Square	0.5042	0.5150	0.5556	0.8421	0.7613	0.2559	0.0674	0.3469

\*Coefficient significant at the 5% level of confidence.

**Table D.7: Results of 21 Month Impact Model, Households With a Black Household Head**

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine	Michigan	Connecticut	North Carolina
<b>Unadjusted Impact</b>	<b>22.3</b>	<b>23.5</b>	<b>-2.4</b>	<b>36.8</b>	<b>30.9</b>	<b>5.3</b>	<b>3.8</b>	<b>35.8</b>
<b>Regression Adjusted Impact</b>	<b>20.9</b>	<b>20.3</b>	<b>-34.6</b>	<b>100.6</b>	<b>3.9</b>	<b>7.8</b>	<b>3.3</b>	<b>33.5</b>
Intercept	10.075 (8.2446)	3.560 (7.8289)	137.428 (258.62)	-38.988 (227.30)	249.486 (181.57)	83.642* (39.719)	-7.412 (53.758)	-5.379 (17.100)
Demo. Flag	20.881 (12.444)	20.288 (10.622)	-34.604 (75.650)	100.603 (74.940)	3.911 (55.437)	7.809 (49.159)	3.335 (24.988)	33.483 (26.358)
Nonelderly Participation Trends	0.120 (0.0937)	0.107 (0.0927)	0.566 (2.4696)	1.371 (1.9717)	1.221 (0.4026)	-0.097 (0.1350)	0.069 (0.2046)	0.118 (0.1049)
Elderly Participants	0.001* (0.0002)	0.001* (0.0002)	0.014 (0.0637)	0.030 (0.0475)	-0.044 (0.0330)	0.001 (0.0097)	-0.017 (0.0466)	0.008 (0.0120)
Elderly Part. Rate	-2.521* (0.7038)	-2.228* (0.7125)	-17.113 (30.625)	-2.577 (23.897)	34.325 (10.989)	-0.286 (9.1630)	6.705 (6.1091)	-1.553 (1.5199)
Prior Changes in Participation of Elderly	0.076 (0.1094)	0.091 (0.1092)	3.185 (9.3571)	-0.755 (7.5597)	1.338 (4.3335)	-0.336 (0.6757)	-2.182* (0.8981)	-0.324 (0.3427)
Percent Non-white	0.269 (0.1802)	0.388* (0.1540)	-0.300 (2.9509)	1.749 (2.7575)	33.369 (15.778)	-1.914 (1.7775)	-0.671 (1.1659)	-0.136 (0.2567)
Percent Elderly	-0.270 (0.2686)	-0.077 (0.2640)	-5.156 (13.575)	0.303 (10.765)	-49.192 (18.061)	-2.968 (2.5789)	2.091 (3.0872)	1.589 (0.9127)
Population Density	0.000 (0.0031)	0.000 (0.0030)	-0.428 (1.1349)	-0.593 (0.8578)	0.390 (0.1795)	0.007 (0.0437)	-0.006 (0.0085)	-0.006 (0.0253)
N	66	66	11	11	10	43	50	94
R-Square	0.3788	0.3873	0.2262	0.5504	0.9607	0.1039	0.1753	0.1317

\*Coefficient significant at the 5% level of confidence.

**Table D.8: Results of 21 Month Impact Model, Households With an Hispanic Household Head**

	Simplified Eligibility		Application Assistance				Commodity Alternative Benefit	
	Gadsden	Leon	Pinal	Yavapai	Maine <sup>a</sup>	Michigan	Connecticut	North Carolina
<b>Unadjusted Impact</b>	<b>22.3</b>	<b>23.5</b>	<b>-2.4</b>	<b>36.8</b>	<b>30.9</b>	<b>5.3</b>	<b>3.8</b>	<b>35.8</b>
<b>Regression Adjusted Impact</b>	<b>0.5</b>	<b>28.6</b>	<b>-25.9</b>	<b>25.6</b>		<b>-62.6</b>	<b>5.1</b>	<b>-10.6</b>
Intercept	42.458 (32.508)	35.346 (29.708)	152.359* (41.584)	125.026* (41.819)		95.735 (48.054)	5.012 (38.489)	-0.579 (107.43)
Demo. Flag	0.470 (37.681)	28.567 (30.134)	-25.888 (17.459)	25.617 (18.079)		-62.577 (50.728)	5.053 (25.465)	-10.647 (56.942)
Nonelderly Participation Trends	0.058 (0.1455)	0.087 (0.1461)	0.182 (0.4803)	0.379 (0.4771)		0.079 (0.1286)	0.163 (0.1046)	-0.644 (0.7295)
Elderly Participants	0.000 (0.0009)	0.000 (0.0009)	-0.018 (0.0135)	-0.011 (0.0134)		0.011 (0.0106)	-0.008 (0.0443)	-0.036 (0.0354)
Elderly Part. Rate	0.990 (2.9591)	1.771 (2.9755)	-8.109* (2.9318)	-7.261 (2.9683)		17.864 (10.298)	1.521 (5.5755)	-0.383 (7.3322)
Prior Changes in Participation of Elderly	0.097 (0.3261)	0.148 (0.3273)	2.477 (1.2221)	1.644 (1.2237)		1.285 (0.7833)	-0.323 (0.2229)	3.500* (1.5989)
Percent Non-white	-0.665 (0.6219)	-0.697 (0.4970)	-1.003 (0.4106)	-0.783 (0.4275)		-1.697 (1.8747)	-0.770 (1.1005)	0.216 (1.2995)
Percent Elderly	-0.529 (0.9292)	-0.305 (0.8899)	-4.732* (1.9095)	-3.911 (1.9145)		-8.716* (3.4293)	0.986 (2.4439)	-1.033 (5.0105)
Population Density	0.001 (0.0085)	0.002 (0.0084)	0.197 (0.2447)	0.110 (0.2433)		-0.037 (0.0454)	0.005 (0.0085)	-0.016 (0.0741)
N	54	54	15	15		47	63	29
R- Square	0.0617	0.0801	0.7595	0.7538		0.2165	0.0838	0.3242

\*Coefficient significant at the 5% level of confidence.

<sup>a</sup>The number of counties with FSP households headed by Hispanic individuals is too small to estimate the model.